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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
KITOV, ZEEV

ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 02/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/724,948	BEHIN ET AL.	
	Examiner	Art Unit	
	Zeev Kitov	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 13, 15 - 22* is/are rejected.

7)☒ Claim(s) *14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 November 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Examiner acknowledges a submission of the formal Drawings, Amendment and Arguments filed on November 12, 2002. Claims 1, 6, 16 and 22 are amended. New art rejection follows.

Specification

1. The spacing of the lines of the specification is such as to make reading and entry of amendments difficult. New application papers with lines double spaced on good quality paper are required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoyama et al. (US 6,094,293) in a view of Netzer et al. (EP Application 0,683,414 A1). Yokoyama et al. discloses most of the elements of the claim, including a rotating element (element 18 in Fig. 11) being a first electrode, a vertical stop disposed proximate the rotating element (element 4' in Fig. 11), a second electrode (elements 98A and 98B in Fig. 11), a means for measuring a

capacitance between electrodes (elements 98A and 98B in Fig. 11, col. 11, lines 66 – 67, col. 12, lines 1 – 8, and elements 402 in Fig. 36, col. 24, lines 11 – 24) and means for determining from the capacitance a digital control state of the device (col. 2, lines 34 – 38). However it measures the capacitance between two fixed electrodes, rather than between moving and fixed electrode. Netzer et al. discloses a measurement of the capacitance between the moving and fixed electrodes (elements 150 and 152 in Fig. 8, col. 8, lines 28 – 39). Both patents have the same problem solving area, namely providing reliable estimation of the mirror position. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the Netzer et al. solution of determination of the mirror position by measuring the capacitance. As to motivation for preferring the Netzer et al. method of measuring the inter-electrode capacitance against the Yokoyama et al., the Netzer et al. method results in more substantial change of a measured inter-electrode capacitance, and therefore a better resolution in estimation of the moving electrode position.

Regarding Claim 2, Netzer et al. discloses means for determining a deviation from a desired control state (Fig. 8 and col. 8, lines 28 – 58).

Regarding Claim 3, Yokoyama et al. discloses the device having two control states (col. 2, lines 34 – 38).

Regarding Claim 4, Yokoyama et al. discloses a means for rotating the rotatable element (col. 6, lines 38 – 67, col. 7, lines 1 - 10).

Regarding Claim 5, Yokoyama et al. discloses a MEMS mirror (col. 1, lines 23 - 32).

Regarding Claim 6, Yokoyama et al. discloses an element configured to rotate between two angular positions (element18 in Fig. 1A - C), one or more electrodes disposed proximate the element (elements98A and 98B in Fig. 11), wherein a capacitance between the element and the electrode has a first value when the element is in a first control state and the capacitance has a second value when the element is in a second control state. It is obvious to one of ordinary skill in the art, that moving the element closer to the electrode would reduce a distance between two plates of a capacitor and therefore would increase a capacitance between them. They further disclose a vertical stop (element 4 in Fig. 1 A – C). Netzer et al. discloses the means for measuring a value of the capacitance between the element and one of the electrodes and the means coupled to the capacitance sensing means for determining a control state of the element from the value of the capacitance (Fig. 5, 6, 9 and 11).

Regarding Claim 7, Yokoyama et al. discloses the device having the first and second angular positions 90^0 apart (see Fig. 1B and 1C).

Regarding Claims 8, 9 and 10, Yokoyama et al. disclose the means for actuating the element (elements 16, 14, 18 and 20 in Fig. 1 A – C, col. 6, lines 62 – 67, col. 7, lines 1 – 13).

Regarding Claim 11, Yokoyama et al. disclose the device having the element connected to the substrate by a hinge (element 14 in Fig. 1 A – C).

Regarding Claim 12, Yokoyama et al. disclose the electrodes disposed on the substrate proximate the element (elements 98A and 98B in Fig.11).

Regarding Claim 13, Yokoyama et al. disclose a vertical stop disposed proximate the element (element 4 in Fig. 1A - C).

Regarding Claim 15, Yokoyama et al. discloses the device having a MEMS mirror (col. 1, lines 23 – 32, col. 2, lines 34 - 35).

As per Claim 16, in addition to limitations of Claim 1, rejected accordingly, it adds a limitation providing an element rotatable relative to a static part between a first control state and the second control state. Yokoyama et al. disclose such rotatable element (elements 16, 14 and 18 in Fig. 1A – C). It further discloses two electrodes disposed proximate to the rotatable element (elements 98A and 98B in Fig. 11). As to the claimed method, it is inherent in the structure of the device.

Regarding Claim 17, Yokoyama et al. disclose applying the electrostatic clamping voltage to one or more of the first and second electrodes (col. 1, lines 23 – 67, col. 2, lines 1 – 5).

Regarding Claims 18 and 19, Yokoyama et al. and Netzer et al. disclose all the elements of the claim. Yokoyama et al. discloses application of DC attracting (holding) voltage (col. 1, lines 23 – 67, col. 2, lines 1 – 5). Netzer et al. discloses an application of a high frequency sensing signal to the plates (col. 8, lines 40 – 43). Since the signals are applied to the same electrodes they are being superimposed.

Regarding Claim 20, Netzer et al. discloses a position sensing circuit participating in a feedback control loop controlling affecting a position control circuitry (Fig. 7). It would be obvious to one of ordinary skill in the art at the time the invention was made to have used the capacitance sensing means for

determining the presence of a fault in the device, if the device failed to reach a target value of the capacitance at predetermined time, because it is common in the art of manufacturing of IC's and MEMS to use any possible means for testing the product at the time of manufacturing.

Regarding Claim 21, Netzer et al. discloses using the value of the capacitance to time the actuation of the element. Fig. 7 shows an element 122, a position control circuitry, generating driving currents through coils 24 and 26 upon values of signals V24, V26 received from an element 124, a capacitive position sensor (col. 7, lines42 – 58, col. 8, lines 1 – 9).

Regarding Claim 22, Yokoyama et al. and Netzer et al. disclose all the elements of the claim. Yokoyama et al. disclose one or more input fibers (elements 16 in Fig. 1a), one or more output fibers (elements 60 A – D in Fig. 4A - B), a micromechanical system optical switch (col. 1, lines 23 - 32), one or more MEMS mirrors (elements 18A – D in Fig. 4A - B) configured to rotate between a first angular position and a second angular position, one or more electrodes disposed proximate each of the one or more mirrors (elements 98A and 98B in Fig. 11). It further discloses the vertical stop element (element 4 in Fig. 1 A – C). Netzer et al. discloses a capacitance between the mirrors and the electrodes having a first value when the mirrors are in a first control state and the capacitance having a second value when the element is in a second control state (col. 8, lines 28 – 58), means for measuring a value of the capacitance between at least one or more mirrors and at least on or more electrodes (elements 150, 152, 154, 156 and 158 in Fig. 8) and means coupled to the capacitance sensing

means for determining a control state of the element from the value of the capacitance (elements 124, 24, 26 and 122 in Fig. 7).

Allowable Subject Matter

3. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose telephone number is (703) 305-0759. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (703) 308-3119. The fax phone numbers for organization where this application or proceedings is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Z.K.
02/03/2003

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